

American Worker Project:  
Securing the Future of America's Working Families

The Setting

# THE FACTORS THAT ARE SHAPING THE 21ST CENTURY WORKPLACE

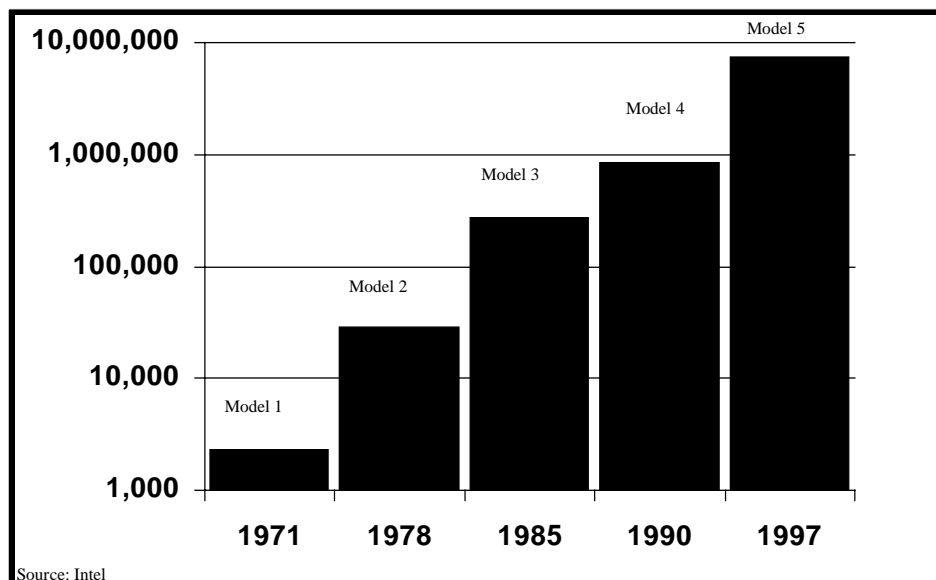
## Introduction

Dramatic change has placed the American workforce in a state of transition. Understanding change and preparing for it, adapting our national policy to meet change and to retain a strong and viable economy in the midst of global competition, is what this report is about. To better understand the elements that are driving workplace changes in the new century, we turned to the Hudson Institute, a private organization noted for its futures research. The Institute analyzed the Census Bureau and Bureau of Labor Statistics' projections and identified the key trends discussed in this chapter.<sup>1</sup>

## Rapid Technological Change

The Technological Revolution continues to change almost every facet of American society. The microchip, the driving force behind a computer, is expected to hold 125 million transistors before the beginning of the next century, up from 65,000 in the late 1970s.<sup>2</sup> Moore's Law, the concept that chip density will double every 18 months, is as good as it gets in predicting the future of the Technological Revolution. All we can predict is that change will occur more rapidly than most Americans could possibly anticipate.

Number of transistors packed onto a single Intel microprocessor;  
5 models and dates of their introduction  
Computer Power Doubling Every 18-20 Months



Currently the MIT Media Laboratory is working on 195 different projects. Here are a few examples:

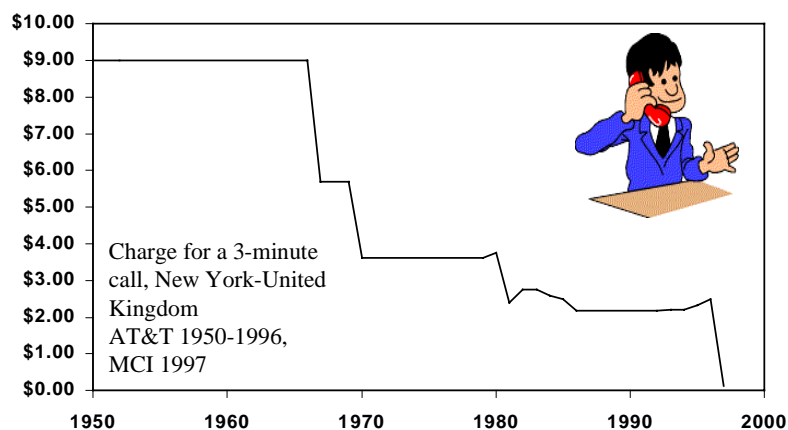
- *Personalized ID tokens:* Tired of having to remember twenty passwords in order to access everything from your computer to your bank account? MIT has designed a plastic token the size of a poker chip bearing an individual's name and image.<sup>3</sup>
- *Wearable computers:* Fabric sensors, threads that conduct a charge, make it possible to wear a keypad, microprocessor, and two speakers capable of playing 32 different synthesized instruments or voices. Weighing only four pounds total, these computer components can be cleverly disguised in one's clothing.<sup>4</sup>
- *LEGO robots:* Children 11 and up are now able to design and program real robots to move, act, and “think” on their own. The typical robot is smaller than a shoebox, capable of moving across a room to pick up a soda can, and returning to its original starting point. Children use their home computers to write a code of instructions for the robot which can then be downloaded onto a RCX microcomputer encased in a LEGO brick about the size of a pack of cigarettes. The microcomputer is the brain that runs the robot, a robot that can be built from 700 LEGO pieces.<sup>5</sup>
- *Personal health monitoring:* Still in the early stages, this invention consists of a four-pound pack to be worn while participating in marathons and mountain climbing. The pack transmits information via the Internet to a lab that logs the information. Just as a black box records the activities of an airplane, MIT is working on turning the four-pound pack into a wristwatch capable of measuring pulse, respiration, temperature, heartbeat, and other vital health data of an individual participating in physical activity.<sup>6</sup>

Moore's Law, the MIT Media Laboratory projects, and the rapid growth of the high-tech industry as described in a separate chapter in this report, all are indicators that rapid technological change will continue to occur. These changes are important because they will affect almost every other aspect of the American economy.

## **Globalization**

Technological advances have left no segment of the American economy untouched. In particular, telecommunications and transportation costs have declined dramatically due to the ability of these two industries to provide faster, cheaper service. The rise of the Internet and other telecommunication technologies have reduced the costs of communicating.

Decrease in Costs of Telecommunications



The reduction in transportation costs has and will continue to create more global competition for American workers in a variety of industries. Some of the implications of lower transportation costs for American workers include:

Industries that employ unskilled American workers are likely to face increasing competition from goods produced in other countries. This competition is a result of cheaper labor costs and reductions in transportation costs. (On average, American unskilled textile workers earn nearly five times as much as their counterparts in developing countries.)<sup>7</sup>

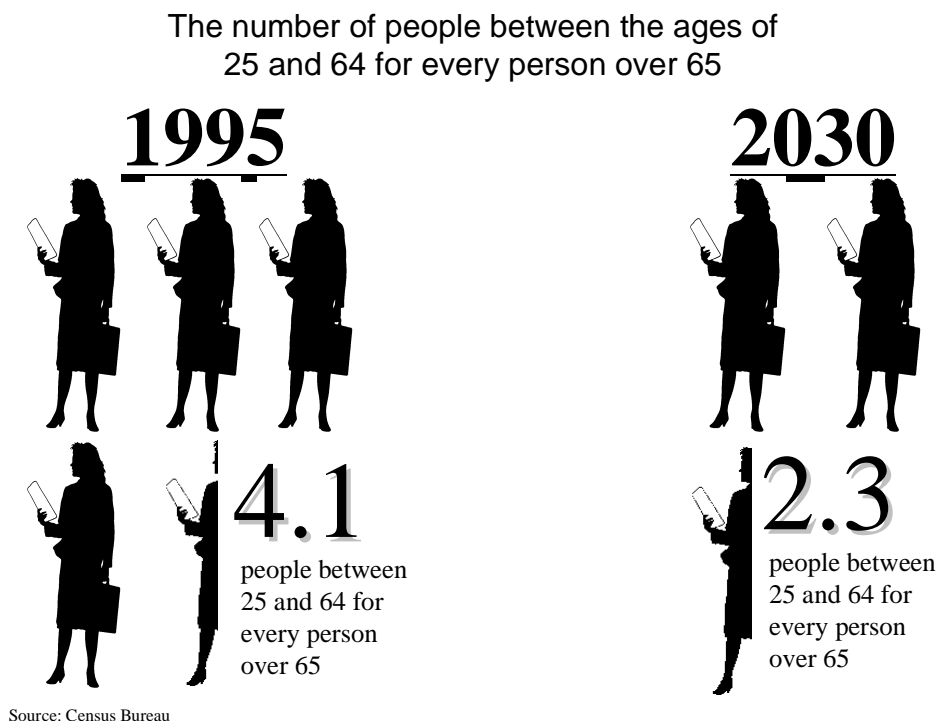
- Technological changes and cheaper telecommunications costs, however, will enable America's high-tech, high-wage workers to supply goods and services to consumers all around the world, increasing the amount of such jobs available in this country.<sup>8</sup>
- Low-skill workers in developing countries are expected to increase their purchasing power as the goods they produce are sold to an expanding world market of consumers. This will create a greater consumer market for American business.<sup>9</sup>

## Aging Population

The first major demographic trend to have profound implications on American society will be the explosion of the elderly population (age 65 and over) by the middle of the next century. Here are a few demographic trends to expect over the next fifty years:

- Until 2010, the elderly population is projected to grow more slowly than ever before in U.S. history. From 1990 to 2010, it will only increase 1.3 percent annually, a decrease from the average annual growth of 2.3 percent from 1950 to 1990.<sup>10</sup>

- After 2010, the elderly population will increase dramatically from representing 13.2 percent of the population in 2010 to 20 percent in 2030, an increase of 30 million elderly people. Most of this expected increase is attributable to the survivors of the baby boom generation reaching 65 and over. In 1995, there were 4.1 times as many people between ages 25 and 64 as there were over 65. By 2030, there will only be 2.3 times as many.<sup>11</sup>
- Increases in the elderly population after 2030 are expected, with all of the increase due to longer life expectancy. In 1995, 3.6 million people were projected to be 85 years and over. By 2050, 18.2 million people are expected to be over 85. In 1995, nearly 21 out of every 100 people were over 64. By 2050, 36 out of 100 are people are expected to be 65 and over.<sup>12</sup>

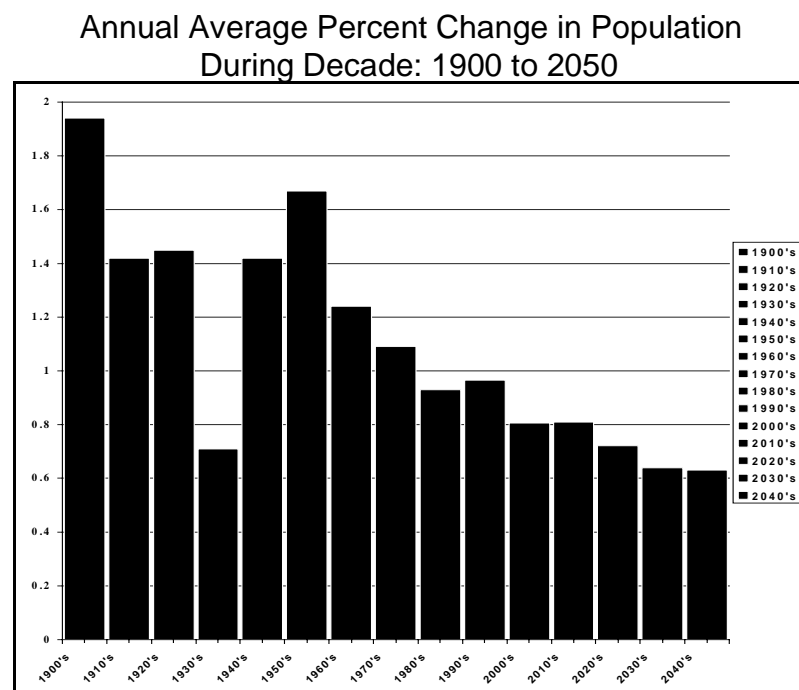


A growing number of elderly people as a percentage of the population will have innumerable social and economic consequences for the future, not the least of which are the need for long-term financial security and quality, affordable health care. In addition, policy-makers must find ways to encourage the active participation and acceptance of the elderly in the workforce. One reason for this is that working elderly usually depend on society less than retired people. Another reason is that the birth rate will be declining. The increasing elderly population could help diminish the loss of productivity from a decreasing rate of population growth.

## Shrinking Workforce

As noted above, another significant trend likely to impact American society in the next century is the annual population and labor force growth rate:

- Between 1986-96, the labor force grew at an annual rate of 2.1 percent. Between 1996-2006, the rate is expected to decline to 1.1 percent annually.<sup>13</sup>
- The slow labor force growth rate will primarily be due to a decrease in annual growth of population expected to hover around 0.8 percent between 1996-2006.<sup>14</sup>
- More women, immigrants, and minorities are expected to enter the workforce, keeping the labor force rate above the population growth rate.<sup>15</sup>
- The population is expected to enter the next century growing at its slowest rate since the 1930s.<sup>16</sup>



Source: Census Bureau





The anticipated decline in labor force growth over previous years will have profound implications on the productive output of the United States. As mentioned earlier, a constant influx of immigrants and greater labor force participation by the growing elderly population can minimize the effects of a slow population growth rate. A more efficient workforce, one that can operate in a climate of innovation and flexibility without excessive government interference will also increase productivity.

## Diversity of the Workforce

The American workforce is also likely to become more racially and ethnically diverse in the future, meaning that the percentages of the minorities in contrast to the whole population will increase:

- In 1986, the white non-Hispanic share of the workforce was 80 percent. In 2006, it is expected to be 73 percent.<sup>17</sup>
- In 1986, the Hispanic share of the workforce was 7 percent. In 2006, it is expected to be 12 percent.<sup>18</sup>
- In 1986, Asians, Pacific Islanders, American Indians, and Alaska Natives accounted for 3 percent of the workforce. In 2006, they will account for nearly 5.5 percent of the workforce.<sup>19</sup>

### Composition of the American Workforce, By Ethnic Group

<div>White non-Hispanic</div> <div></div> <div><div><u>1995</u></div><div>76%</div><div><u>2020</u></div><div>68%</div></div>	<div>Oriental non-Hispanic</div> <div></div> <div><div><u>1995</u></div><div>4%</div><div><u>2020</u></div><div>6%</div></div>
<div>Black non-Hispanic</div> <div></div> <div><div><u>1995</u></div><div>11%</div><div><u>2020</u></div><div>11%</div></div>	<div>Hispanic</div> <div></div> <div><div><u>1995</u></div><div>9%</div><div><u>2020</u></div><div>14%</div></div>

Source: Bureau of Labor Statistics and Hudson Institute

More diversity in the workplace will bring many benefits, opportunities and challenges. To comply with equal opportunity laws, many employers will have to be innovative in their recruiting efforts. Linguistic and other cultural differences will also present challenges.

## **Key U.S. Industries and Changes in Those Industries**

The impact of the Technological Revolution and the global competition it has spawned is best measured by tracing the history of industries of which the economy is composed. Due to U.S. government's classification of the U.S. economy by industry, one can measure the changes in the past 50 years or so.

### **Agriculture, Forestry, and Fishing<sup>20</sup>**

- In 1938, agriculture, forestry, and fishing employed nearly 22 percent of the workforce.
- In 1997, slightly fewer than 3 percent of the workforce was employed by the industry.
- In 1947, agriculture, forestry, and fishing accounted for 8.5 percent of the Gross Domestic Product (GDP).
- In 1996, it accounted for only 1.7 percent of the nation's productive output.
- In 1950, 12.2 percent of the population lived on farms.
- In 1998, only 1.9 percent lived on farms.
- Number of farms that use:
  - computers: 83.8 percent
  - cellular phones: 73.2 percent
  - fax machines: 41.9 percent
  - the Internet: 32.2 percent

### **Automotive<sup>21</sup>**

- In 1939, the motor vehicle and equipment industry employed 1.2 percent of the workforce.
- In 1998, it employed 0.8 percent of the workforce.
- In 1941, 52 percent of public urban roads were unpaved.
- In 1995, 4 percent of public urban roads were unpaved.
- In 1950, there were over 49 million vehicles registered in the U.S.
- In 1996, there were over 229 million vehicles registered.
- Innovations introduced in 1938 included electric turn signals, sliding sunroofs, and steering-column gearshifts.
- The latest innovations include Global Positioning System Locators that navigate a vehicle's direction, Buicks that automatically maintain a safe distance from vehicles ahead, and seat cushions that sense the weight distribution of the driver or passenger and quickly adjust the shape of as many as eight internal cushions, with built-in seatbelt attachments and side airbags.



## **Banking<sup>22</sup>**

- In 1938, there were 72 bank mergers.
- In 1996, there were 473.
- In 1938, there were 74 bank failures.
- In 1996, there were 5.
- In 1938, there were 150 FDIC-insured commercial banks.
- In 1997, there were 9,215.

## **Construction<sup>23</sup>**

- In 1938, 2.4 percent of the workforce was employed in the construction industry.
- In 1998, 4.4 percent were construction employees.
- In 1947, the industry accounted for 0.37 percent of the GDP.
- In 1996, it accounted for 4 percent.
- In 1978, the cost of a median priced home was \$55,700.
- In 1996, a median priced home cost \$140,000.
- New homes consume half as much energy as homes built prior to 1980.

## **Energy<sup>24</sup>**

- Prior to the 1950s coal and wood consisted of the majority of household energy consumption.
- Currently, most homes use natural gas and electricity.
- Twenty new cars today are needed to produce the tailpipe pollution of one new car in the 1960s.
- Homes built between 1988-93 use one-fifth less energy than homes built before 1980.
- Fuels made from fast-growing trees, shrubs, and grasses may replace oil.
- Energy crops are being converted into liquid fuels to power vehicles on U.S. roads.

## **Manufacturing<sup>25</sup>**

- In 1939, 23.8 percent of the workforce was employed by the manufacturing industry.
- In 1998, 15.2 percent were in manufacturing.
- Increase in overall productivity in manufacturing since 1960: 285 percent
- Increase in overall productivity for private non-farm economy since 1960: 188 percent

- Technology has aided manufacturing in numerous ways:
- Engineers can develop new products on computer screens and transmit plans directly to the factory floor for production
- Statistical quality control reduces defect rates
- Just-in-time inventory control led to more efficient deliveries

## **Mining<sup>26</sup>**

- In 1938, the mining industry employed 2 percent of the workforce.
- In 1998, the industry employed 0.46 percent of the workforce.
- In 1947, the industry contributed to 2.8 percent of the GDP.
- In 1996, the industry accounted for 1.5 percent.
- Percent of land touched in U.S. by mining: less than one-fourth of 1 percent.
- Decline in sulfur dioxide emissions since 1973: 28 percent.
- Amount of coal combustion by-products recycled and used in cement production, road construction, and roofing each year as of 1996: 21 million tons.

## **Steel<sup>27</sup>**

- In 1947, fabricated metal products and primary metal industries employed 4 percent of the workforce.
- In 1998, the industries employed 1.8 percent of the workforce.
- In 1947, the steel industry accounted for 4 percent of the GDP.
- In 1996, the steel industry accounted for 2 percent.
- If the Sears Tower were built today instead of 1974, it could be built with 35 percent less steel.
- Steel recycling saves enough energy to electrically power about one-fifth of U.S. households for one year.

## **Textile<sup>28</sup>**

- In 1939, the textile mill products, apparel, and other textile products industries accounted for 4.7 percent of total employment.
- In 1998, the industries accounted for 1.1 percent of employment.
- In 1947, textile industries accounted for 3.3 percent of the GDP.
- In 1996, the industries accounted for 0.68 percent of the GDP.
- In 1900, cotton yielded 120 pounds per acre.
- In 1996, cotton yielded 600 pounds per acre.

## Findings and Recommendations

The trends noted in this chapter point to an economy that will continue to change dramatically. To adapt, this country must develop a strategy for workplace excellence, welcoming change as a necessary ingredient to maintaining a healthy and robust economy. Our workplaces have already begun the transition from an industrial age past to a high-tech future; our laws must do the same, or we will face the possibility of losing our leading position in a global economy.

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<sup>1</sup> RICHARD W. JUDY and CAROL D'AMICO, WORKFORCE 2020 (Hudson Institute 1997).

<sup>2</sup> Id.

<sup>3</sup> M.J. Zuckerman, *Inventing the Future*, Tech Report-USA TODAY, August 12, 1998.

<sup>4</sup> Id.

<sup>5</sup> Id.

<sup>6</sup> Id.

<sup>7</sup> RICHARD W. JUDY and CAROL D'AMICO, WORKFORCE 2020 (Hudson Institute 1997).

<sup>8</sup> Id.

<sup>9</sup> Id.

<sup>10</sup> Id.

<sup>11</sup> Id.

<sup>12</sup> Id.

<sup>13</sup> Id.

<sup>14</sup> Bureau of the Census, *Population Projections of the United States by Age, Sex, Race, and Hispanic Origin: 1995 to 2050*, February, 1996

<sup>15</sup> Id.

<sup>16</sup> Id.

<sup>17</sup> Id.

<sup>18</sup> Id.

<sup>19</sup> Id.

<sup>20</sup> Id.

<sup>21</sup> THE AMERICAN WORKER PROJECT, SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS, COMMITTEE ON EDUCATION AND THE WORKFORCE, U.S. HOUSE OF REPRESENTATIVES, A *BROCHURE ON TEN KEY U.S. INDUSTRIES AND HOW THEY HAVE CHANGED* (1998).

<sup>22</sup> Id.

<sup>23</sup> Id.

<sup>24</sup> Id.

<sup>25</sup> Id.

<sup>26</sup> Id.

<sup>27</sup> Id.

<sup>28</sup> Id.